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EXAMINER	
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ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,531	FECHTEL ET AL.	
	Examiner	Art Unit	
	DAVID HUANG	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Request for Continued Examination

1. The request filed on 3/30/2011, for a Request for Continued Examination (RCE), is acceptable and a RCE has been established. An action on the RCE follows.

Response to Arguments

2. Applicant's arguments with respect to claim 1 have been considered but are not persuasive.

Applicant's argument: Both Lepla and Dupree are silent with respect to the programmable memory 9 can be programmed externally via an interface circuit 12 through a plurality of internal data lines.

Examiner's response: Hui discloses whitening filters are determined in advance for each candidate auto-correlation value and saved in memory, and the predetermined whitening filter is selected at block 515 (col. 10, lines 4-7). Thus, each candidate auto-correlation values (expected spurious signal energy), is associated with different whitening filters stored in memory (weights). Hui further discloses auto-correlation memory 420 for storing candidate auto-correlation values corresponding to disturbances v(n) (col. 9, lines 40-67, Figs. 4 and 5; see also col. 2, lines 15-40 for auto-correlation of disturbance v(n); equation 2). Thus, the auto-correlation memory 420 sets the expected/candidate auto-correlation values external to the channel estimator 415.

While Lepla, Hui and Dupree do not explicitly disclose that the interface itself is external, this would have been an obvious matter of design choice, since Hui already discloses that the expected/candidate auto-correlation values are external to the channel estimator 415 which would suggest an interface to bring values in, and applicant has not disclosed that the external

interface solves a particular problem, or is for some special purpose, and it appears that the system would perform equally well with either an internal or an external interface.

Applicant's argument: The combination of would not be the same as the claimed … programmable memory being connected to the selector via a plurality of address lines, and the selector being capable of selecting a particular weighting coefficient set from the plurality of weighting coefficient sets stored within the memory.

Examiner's response: Hui discloses whitening filters are determined in advance for each candidate auto-correlation value and saved in memory, and the whitening filter h(n) corresponding to each candidate auto-correlation is selected at block 515 (col. 10, lines 4-7). Thus, each candidate auto-correlation values (expected spurious signal energy - treated as an "address"), is associated with different whitening filters stored in memory (weights - treated as "memory contents").

Therefore, the programmable memory is connected to the selector which selects a specific whitening filter ("set of weighting coefficients") according to a specified candidate auto-correlation ("address") from the memory. The only difference is that there are a plurality of address lines between the programmable memory and the selector.

This would have been an obvious matter of design choice, since applicant has not disclosed that the use of a plurality of address lines as opposed to a single implied address line (candidate auto-correlation) solves a particular problem or is for some special purpose, and it appears that the memory access for the system would perform equally well with either one or a plurality of address lines.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, 2, and 4-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 14-16 recite "said... energy is set externally; wherein the memory is programmable via an external interface... internal data lines". However, these terms "externally," "external," and "internal" are ambiguous since they are unclear with respect to a point of reference. The limitation raise the question, "external/internal to what?" For examination on the merits, the claim will be interpreted as best understood.

Claims 2 and 4-6 are dependent on claim 1, and are also rejected.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vandenameele-Lepla (US 2003/0128751 - hereinafter Lepla) in view of Hui et al. (US 6,674,820, hereinafter "Hui"), applicant's admitted prior art (specification, pages 2-3, Fig. 2; hereinafter "APA"), and Dupree (US 5,175,558).

Regarding claim 1, Lepla discloses a weighting circuit for a receiver which is provided for receiving a multicarrier signal comprising carrier signals (carrier-specific weighting factors of a multi-carrier signal in a receiver, page 2, [0013]),

wherein the weighting circuit weights the carrier signals such that the spurious signal energy is of equal magnitude for all weighted carrier signals (value of each carrier-specific weighting factor is inversely proportional to a noise power associated with the carrier, page 3, [0021]; weights are the inverse of the noise power for a carrier page 6, [0051]; thus, if the weights are the inverse of the noise power, then the noise after application of the weights to each carrier would be 1, i.e. [$x * (1/x) = 1$]),

However, Lepla fails to expressly disclose:

(i) a memory storing a plurality of weighting coefficient sets, and

(ii) a selector selecting one of the plurality of weighting coefficient sets stored in the memory on the basis of an expected spurious signal energy in the received signal,

(iii) an estimation unit calculating said expected spurious signal energy using a first cross correlation between the received signal and a spurious signal to be expected, and a second cross correlation between the received signal and a spurious signal to be expected which has been phase-shifted through 90°,

(iv) wherein said expected spurious signal energy is set externally; and

(v) wherein the memory is programmable via an external interface connected to said memory through a plurality of internal data lines, and

(vi) wherein the programmable memory is connected to the selector via a plurality of address lines,

(vii) the selector being capable of selecting a particular weighting coefficient set from the plurality of weighting coefficient sets stored within the memory.

Nevertheless, Lepla discloses the values of the carrier-dependent weights are controlled to account for the effect of frequency-dependent (non-white) noise in the system (page 6, [0050]; non-white = frequency dependent, page 2, [0013]), and the noise power spectrum is measured off-chip and values for the carrier dependent weights programmed into weight source 310 (page 6, [0051], Fig. 3).

With respect to items (i), (ii), (iv) and (vii), Hui et al. discloses systems for receiving signals subject to colored noise (title, Fig. 4). Hui et al. discloses systems for estimating the color of the baseband noise by selection of the best result among a plurality of candidate noise color assumptions (col. 3, lines 37-41). The color characteristic of the colored noise may be an auto-correlation of the colored noise (col. 3, lines 55-60). Whitening filters are determined in advance for each candidate auto-correlation value and saved in memory, and the predetermined whitening filter is selected at block 515 (col. 10, lines 4-7). Thus, each candidate auto-correlation values (expected spurious signal energy - treated as an "address"), is associated with different whitening filters stored in memory (weights - treated as "memory contents"). Therefore, the programmable memory is connected to the selector which selects a specific whitening filter ("set of weighting coefficients") according to a specified candidate auto-correlation ("address") from the memory.

Hui further discloses auto-correlation memory 420 for storing candidate auto-correlation values corresponding to disturbances v(n) (col. 9, lines 40-67, Figs. 4 and 5; see also col. 2, lines 15-40 for auto-correlation of disturbance v(n); equation 2). Thus, the auto-correlation memory 420 sets the expected/candidate auto-correlation values external to the channel estimator 415.

Because both Lepla and Hui disclose receiving apparatus and methods for accounting for colored (non-white noise) by selecting a set of weighting factors/filter (coefficients), it would have been obvious to one of ordinary skill in the art to substitute one teaching for the other, for the predictable result of storing different sets of factors/filter (coefficients) in memory and selecting one based on the color characteristic of the non-white/colored noise, and setting the candidate auto-correlation values external from the channel estimator.

With respect to item (iii), APA discloses a prior art receiver with an estimation unit that calculates the spurious signal by a first cross-correlation between the received signal (via the ADC) and a spurious signal to be expected, and a second cross correlation between the received signal and a spurious signal to be expected which has been phase-shifted through 90° (page 3, lines 5-9).

Furthermore, Hui also discloses auto-correlation of the colored noise is calculated according to equation 8 (col. 8) with an autocorrelation lag l, such that the two signals multiplied together are time-delayed (phase-shifted) versions of the signal.

Because both APA and the combination of Lepla and Hui et al. disclose correlation calculations to determine noise signal energy, it would have been obvious to one of ordinary skill in the art to substitute one teaching for the other for the predictable result of generating a signal by a first cross-correlation between the received signal and a spurious signal to be expected, and

a second cross correlation between the received signal and a spurious signal to be expected which has been phase-shifted through 90°

With respect to item (v), Lepla discloses a noise power spectrum measured off-chip and values for the carrier dependent weights programmed into weight source 310, page 6, [0051], Fig. 3).

Dupree discloses weight memory 66, connected to sequential update 56, internal to system 24 (Fig. 2).

Because both Lepla and Dupree discloses updating/programming weight memory/storage, it would have been obvious to one of ordinary skill in the art to substitute one weight memory update scheme for the other, for the predictable result of a memory updated via internal data lines.

With respect to item (vii), Lepla, Hui, and Dupree disclose everything above, but do not explicitly disclose that there are a plurality of address lines between the programmable memory and the selector.

This would have been an obvious matter of design choice, since applicant has not disclosed that the use of a plurality of address lines as opposed to a single implied address line (candidate auto-correlation) solves a particular problem or is for some special purpose, and it appears that the memory access for the system would perform equally well with either one or a plurality of address lines.

Regarding claim 2, Lepla, Hui, and APA disclose everything applied to claim 1, and Hui further discloses the weighting circuit has at least one multiplier which multiplies an associated

carrier signal by a stored weighting coefficient from the selected weighting coefficient set (FIR whitening filter multiplies filter coefficients {h(k)} and signal r(n), col. 9, lines 3-10).

Regarding claims 4 and 5, Lepla discloses everything applied to claim 3, and further discloses the multicarrier signal is broken down into carrier signals by a computation circuit that is a Fast Fourier Transformation circuit (FFT 126, Fig. 1).

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vandenameele-Lepla in view of Hui, APA and Dupree as applied to claim 5 above, and further in view of Nasserbakht (US 6,122,703).

Regarding claim 6, Lepla, Hui, and APA disclose everything applied to claim 5, but fail to expressly disclose the carrier signal broken down by the computation circuit are buffer-stored in a buffer store.

However, FFT output buffers are well known in the art, as evidenced by Nasserbakht (FFT output buffer 326, col. 10, lines 49-56, Fig. 3).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide an output buffer for storing the output of the FFT circuit, since FFT output buffers are well known in the art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID HUANG whose telephone number is (571)270-1798. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DSH/dsh
4/24/11
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